

# Boston Drug Analysis Laboratory

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# Welcome to the Boston Drug Lab!

## ◆ Mission Statement:

- Identifies unknown substances for local, state and federal agencies in Massachusetts.
- Provides accurate and timely analysis.
- Provide Certificates of Analysis.



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# Melendez-Diaz

◆ Trials scheduled: 3065

◆ # of chemist's appearances: 447

Impact of Melendez-Diaz from June 26<sup>th</sup>, 2009 through  
March 31<sup>st</sup>, 2011 on the Boston Drug Analysis Laboratory.

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# Evidence Submission



- ❖ At the evidence window, the evidence officer will receive various types of evidence from police departments.
- ❖ Consists of many different types:
  - Substance (Cocaine, Heroin, etc)
  - Rx
  - Marijuana

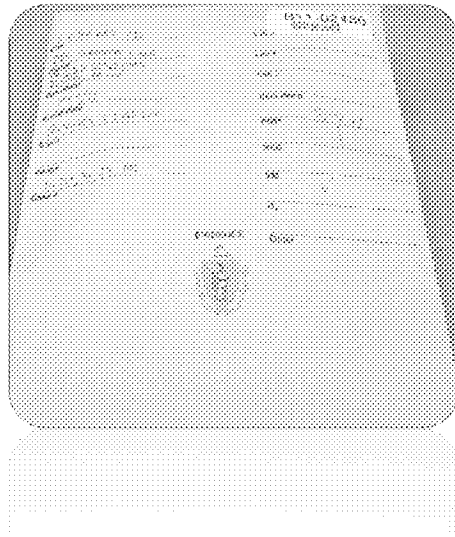
# Evidence Submission

- ◆ A Drug Receipt is filled out. It will contain the following information:

- Submitting PID and officer.
- Defendant's name (if known)
- A description of the item(s).
- An initial gross weight of the evidence .
- Then each piece of evidence is assigned a laboratory number.

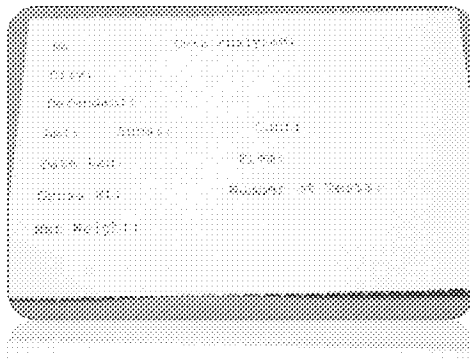
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# Evidence Submission



- ◆ The sample is received in a heat sealed and initialed plastic bag.
- ◆ The sample is placed into the manila envelope.
- ◆ A bar code with the appropriate Lab # will be adhered to a manila envelope.

# Evidence Submission



- ◆ An Evidence Control Card is generated based on the information on the drug receipt.
- ◆ The control card is placed in the manila envelope and put into the safe.
- ◆ At this point , the chain of custody is with the Evidence Office

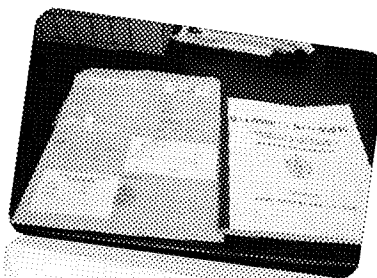
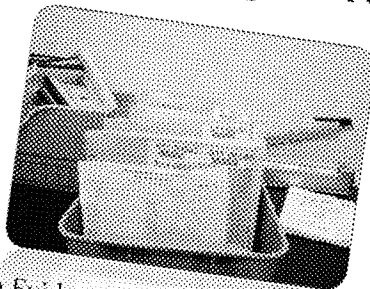
# The Safe

Evidence is transferred to the safe for storage



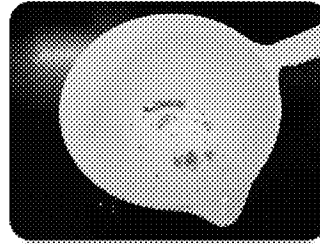
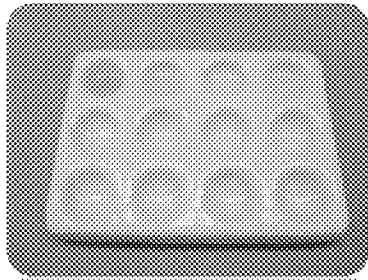


# Case Assignments



- ◆ An Evidence Officer assigns the samples to individual chemists.
- ◆ The chemist will review the envelope, control card and the sample for accuracy. The chemist accepts custody of the sample by signing the corresponding Log Book.
- ◆ Now, the chain of custody is with the Chemist

# Analysis



- ❖ The Chemist will analyze the substances according to the Lab Policies and Procedures.
- ❖ The Lab follows the recommendation set forth by the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG).
- ❖ There are different procedures based on the type of sample being analyzed (i.e. a suspected cocaine sample vs. a suspected marijuana sample)

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# Preliminary Analysis - Substance

- ◆ QC of Balance/s
- ◆ QC of Reagents
- ◆ Drug Analysis (Powder) Sheet
  - Chemist's hand notations in regards to the sample

The image shows a 'Drug Analysis (Powder) Sheet' form. It is a structured document with various fields for recording chemical analysis results. The form includes sections for sample identification, reagents used, and analytical results. There are handwritten entries in some fields, particularly in the 'Sample ID' and 'Reagents' sections. The form is titled 'Drug Analysis (Powder) Sheet' at the top.

# Preliminary Analysis - Substance

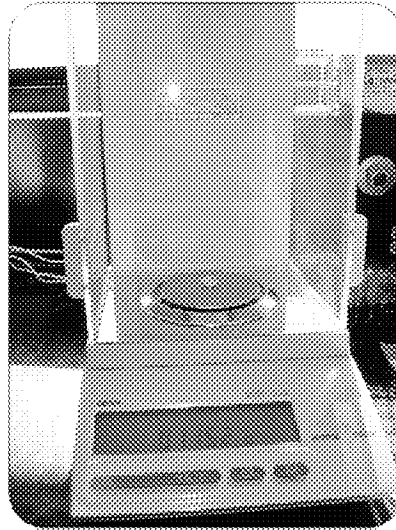
## Weight

◆ The weight of the sample can be determined by two methods:

- Indirect
- Direct

◆ Sampling Plan

- 10%
- Square Root
- Hypergeometric



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## Preliminary Analysis – Heroin

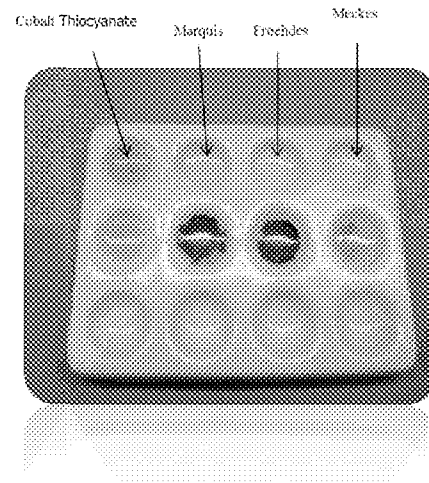


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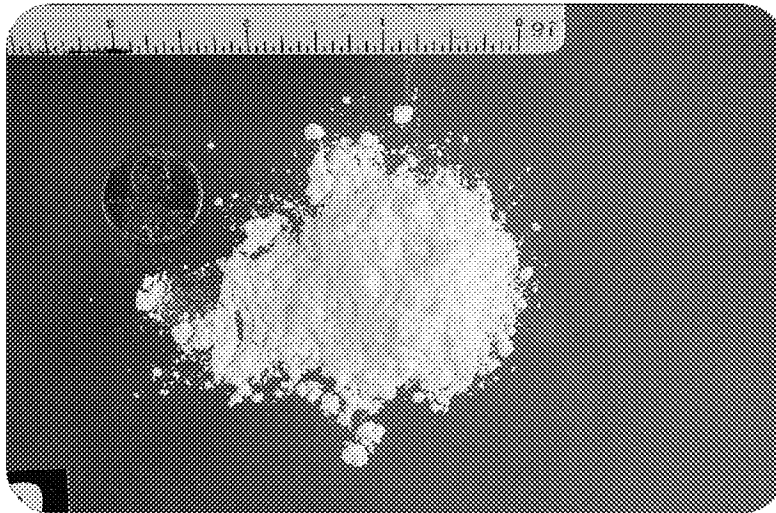
# Preliminary Analysis – Heroin

## Spot Test

- ❖ Spot tests are performed on the substance.
  - ✓ A total of four spot tests
    - Cobalt thiocyanate
    - Marquis
    - Froehdes
    - Meckes
  - ✓ A purple color change for the Marquis and Froehdes, and a green color change for the Meckes, indicates that the substance may be presumptively positive for an opiate.



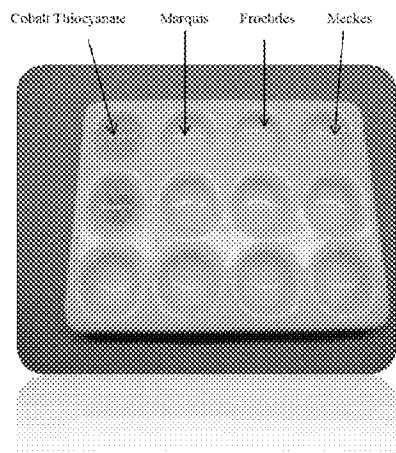
## Preliminary Analysis – Cocaine



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# Preliminary Analysis – Cocaine

## Spot Test



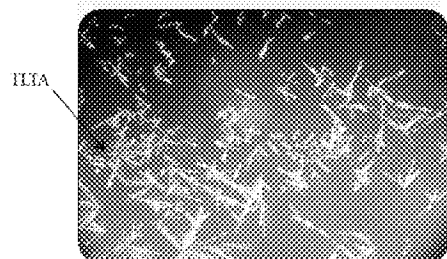
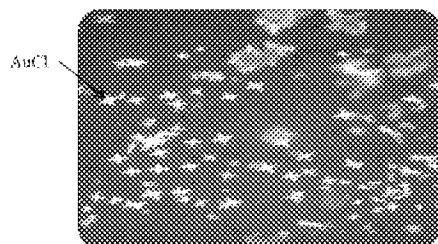
◆ Spot tests are performed on the substance.

- ✓ A total of four spot tests
  - Cobalt thiocyanate
  - Marquis
  - Froehdes
  - Mecke's
- ✓ A blue color change in the cobalt thiocyanate indicates that substance may be presumptively positive for cocaine.



# Preliminary Analysis – Cocaine

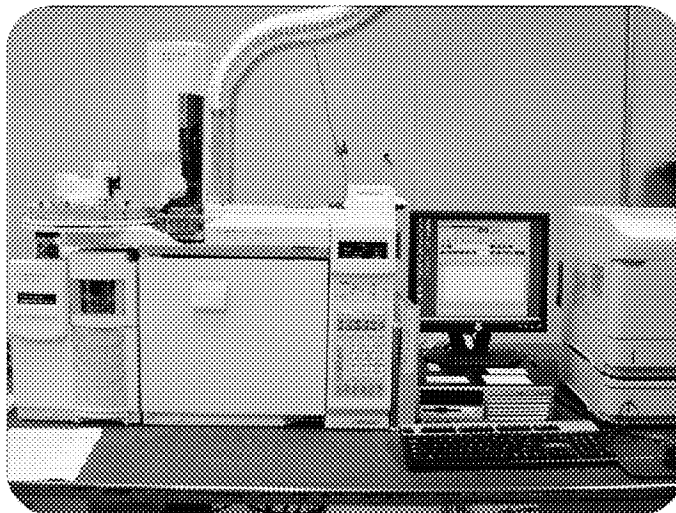
## Microcrystalline Tests



- ◆ Performed if there is a positive cobalt thiocyanate test.
- ◆ Two microcrystalline tests (Structural ID)
  - Gold chloride (AuCl<sub>3</sub>)
  - di-p-toluoyl-L-tartaric acid (TLTA)
- ◆ When these reagents are added to cocaine samples, they will form specific types crystals that can be viewed under a microscope.

# Confirmatory Analysis

Gas Chromatography/Mass Spectrometry (GC-MS)

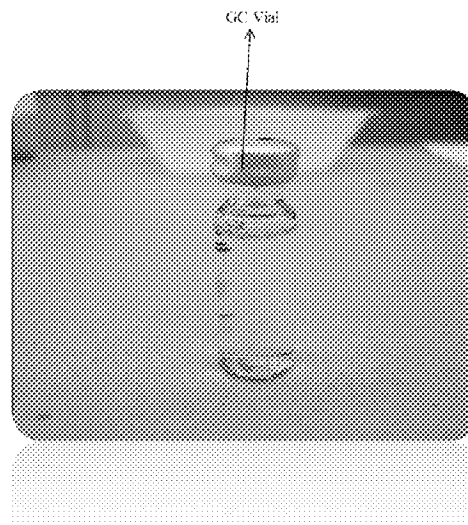


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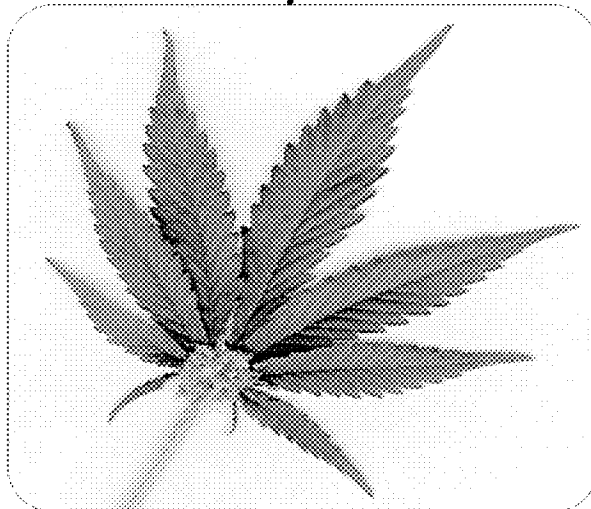
# Confirmatory Analysis

## Gas Chromatography/Mass Spectrometry (GC/MS)

- ❖ For substances from Class A to D, samples are submitted to GC/MS for confirmatory testing.
- ❖ A small amount of the substance is placed in a vial and dissolved with a solvent (methanol).
- ❖ An aliquot of the sample is used when injected into the GC/MS.
- ❖ The instrument separates the components of the substance and then breaks it down into ions, and a chromatogram is generated.
- ❖ The Confirmatory Chemist analyzes the chromatogram of the unknown sample against a known standard to determine the presence of the illicit narcotic.



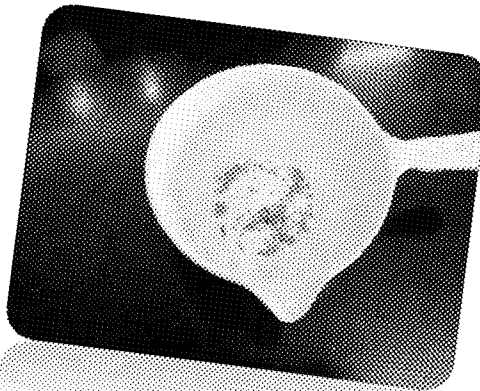
## Analysis – Marijuana



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# Analysis – Marijuana

## Macroscopic identification

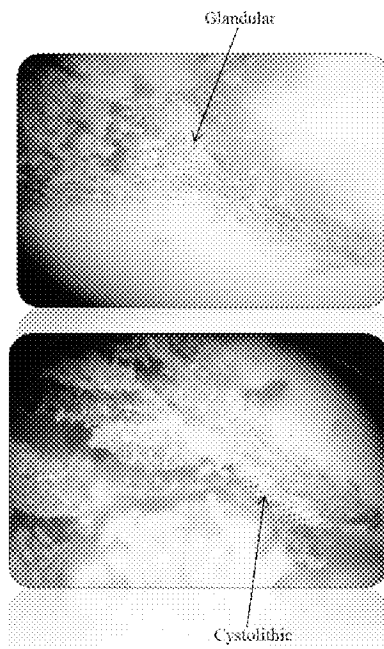


- ◆ A macroscopic examination of the sample is done.
- ◆ Identify serrated leaves and morphological characteristics.
- ◆ Does it look like green, leafy, vegetable matter?

# Analysis – Marijuana

## Microscopic identification

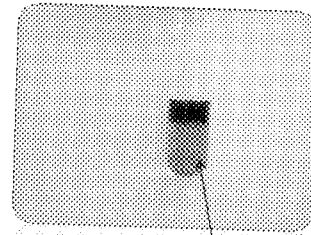
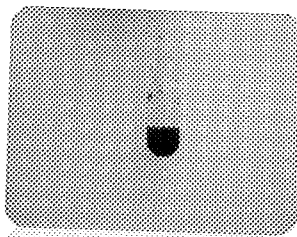
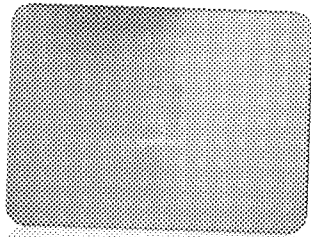
- ❖ A microscopic identification of the sample is performed using a stereoscope.
- ❖ Identify two particular types of hairs. (Structural ID)
  - Cystolithic (bearclaws)
  - Glandular



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# Analysis – Marijuana

## Modified Duquenois Levine Test



❖ A Modified Duquenois Levine test is performed.

- QC of Reagents
- The chemist will perform a series of extractions during this test
- The transfer of purple color from one layer to another, indicates the presence of THC

## Analysis – Rx

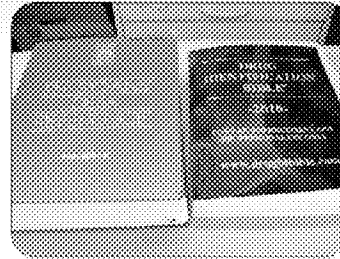


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# Analysis – Rx

- ❖ Examine & document each pill for identifying marks (shape, color, imprint).
- ❖ Number of pills and the net weight is documented.
- ❖ Compare the ballistics to those in a pharmaceutical reference .
  - Micromedex Software (licensed)
  - Drug Identification Bible
  - Physician's Desk Reference (PDR)
- ❖ Those substances containing an active ingredient from Class A to D will undergo confirmatory testing by GC/MS.
- ❖ Class E substances are confirmed by appearance and labeling .

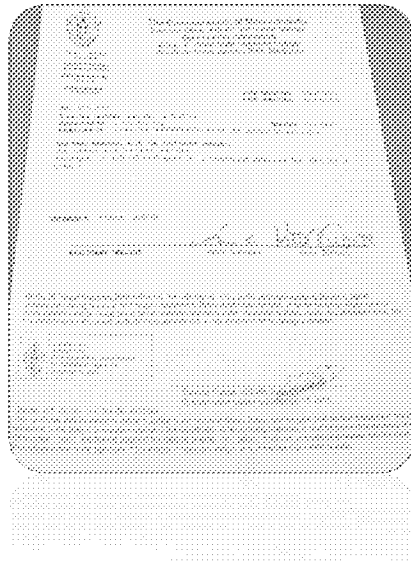


# Evidence Control Card

- ◆ The evidence control card is filled out by the chemist/s.
  - Results
  - Net Weight
  - Date analyzed
  - Chemist/s who performed the analysis
- ◆ Card is returned to the evidence office.
- ◆ A Certificate of Analysis is generated based on the information on the control card.

No. 811-61556		Date Analyzed: 01/15/11
City: Quincy Police Dept		
Officer: Detective STEVEN COOK		
Def: MURKIN JAMES		
Amount	6.28oz 15.6g	
No. Cont: 1	Cont. paper Pkg	
Date Rec'd: 02/09/2011	No. Analyzed:	
Crack (g): 2.93	Net Weight: 0.40g	
	# Tests: 1/1/10	
	# Doses: 1	
Initial: [Signature]	Findings: Cocaine	

# Certificate of Analysis



- ◆ A Certificate of Analysis is generated for each Lab#. It is reviewed and signed by the chemist/s.
- ◆ The first signature is the custodial chemist, who maintains custody of the sample and performs the preliminary analysis & net weight. The second signature is the chemist who performs confirmatory testing.
- ◆ Then the Certificate is notarized.

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# Evidence Returns



- ◆ Upon completion, the sample and the Certificate of Analysis is placed in the manila envelop. Both the envelope and the control card will be returned to the safe.
- ◆ Evidence and drug certificates are returned to the appropriate law enforcement agency.

# Court

## Discovery Packets

- ◆ ADAs may request, in writing, a discovery packet from the lab via email or fax.
- ◆ Include the Lab # on the discovery request.
- ◆ 14 days advance notice for discovery packets.
- ◆ Discovery packets will consist of:
  - Drug Receipt
  - Evidence Control Card
  - Chemist Drug Analysis Sheets
  - GC/MS Analytical Data

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# Court

## Summons

- ◆ Summons can be emailed, faxed or mailed to the Lab.
- ◆ Include the Lab # on the summons.
- ◆ 30 days advance notice for summons.
- ◆ 48 hours verbal or email follow-up, if needed to appear for court.

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